



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
-----------------	-------------	----------------------	---------------------	------------------

10/822,686

04/13/2004

Hyo-suk Kim

1572.1262

2992

21171

7590

10/04/2007

STAAS & HALSEY LLP

SUITE 700

1201 NEW YORK AVENUE, N.W.

WASHINGTON, DC 20005

EXAMINER

LOPEZ, FRANK D

ART UNIT

PAPER NUMBER

3745

MAIL DATE

DELIVERY MODE

10/04/2007

PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary

Application No.

10/822,686

Applicant(s)

KIM, HYO-SUK

Examiner

F. Daniel Lopez

Art Unit

3745

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on 7/13/07.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☐ Claim(s) 1,3-6,8 and 10 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☐ Claim(s) 1,3-6,8 and 10 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

Response to Amendment

Applicant's arguments filed July 13, 2007, have been fully considered but they are not deemed to be persuasive.

Applicant's arguments with respect to claims 1, 3-6, 8 and 10 have been considered but are deemed to be moot in view of the new grounds of rejection. The new grounds of rejection are necessitated by the added limitation that "first sensor coil and a second sensor coil connected in series" (claim 1 line 4).

Applicant appears to argue that fig 6b shows the input waveform of the voltage comparator, and is not directed to when the upper core passes the middle point. The examiner is mystified. The discussion of fig 6b continues on to say that it is when the upper core passes the middle point. The waveform appears to be the waveform for several cycles of movement of the cores in the coils. Assuming that this is true, the specification should be corrected.

Applicant states that paragraph 41 is directed to the output V0 of the voltage comparator, at the second zero point. But paragraph 41 clearly indicates that the piston passes the top origin point twice, once on the way up (compression) and once on the way down (expansion). How is this shown in the graphs?

Applicant argues that paragraphs 44-48 "contain enabling disclosure of how to calculate top dead center". The examiner disagrees. The paragraphs 44-48 talk about measuring the time the piston takes to pass the top origin (or bottom origin) twice, and that it is related to the position of the top dead center. This is understood by the examiner. But time is not position. How applicant goes from time to position is not understood and not discussed anywhere in the specification.

Applicant appears to argue that the length of the upper and lower cores are each longer than half the combined lengths of the first and second sensor coils of Shimizu et al, since the core includes a plurality (i.e. more than 2) rather than just an upper and a lower core. The examiner disagrees. It is understood that the core of Shimizu et al includes an upper and a lower core and some more cores in between, and so the claims relate to the lengths of the individual cores, not some combined length.

Applicant appears to argue that "substantially equal" means equal to or slightly greater than. The examiner disagrees. The examiner understands that "substantially equal" also means slightly smaller than, which meets the claimed limitation.

The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

Specification

The disclosure is objected to because of the following informalities:

paragraph 26 states "a first sensor coil 2a connected in series with a second sensor coil 2b" which is wrong. Fig 5 clearly shows that the coils in parallel not in series.

paragraph 35 states "Fig. 6B represents the input waveform...when a center point...of the upper core 4a passes a middle point...between the first sensor coil 2a and the second sensor coil 2b" is wrong, since it shows the waveform as the cores move back and forth. It would be helpful to know when, during the cycle, the upper core passes the middle point, but this is not shown in fig 6B.

Paragraph 37 states "when the upper core origin is inclined toward the first sensor coil 2a", which is confusing. Is this a situation where the center of movement of the core is closer to the first coil than the second coil?

Paragraph 41 states "When the second output V_o ...is at the second zero point during the compression stroke...the piston is at a top original position. The top origin position is also passed during an extension stroke. The top origin is a fixed position, and an exact position of the top dead center can be estimated by measuring the amount of time that the piston takes to pass the top origin twice". If the top origin is passed twice, shouldn't there be two second zero points? This is not shown by the graph of fig 8. It is assumed that the top dead center is estimated by integrating the speed of the core over a first half of the time between passing the origin twice. But, how is the speed calculated? This is at the end of the movement of the piston, so the piston is moving relatively slowly, stops, and then reverses direction. There appears to be no way shown to estimate the speed during this time, and therefore, the position of top dead center can't be estimated. If applicant has a different way to estimate the position of top dead center, it needs to be disclosed.

Appropriate correction is required. No new matter can be entered.

Claim Rejections - 35 USC § 112

Claims 6, 8 and 10 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the enablement requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention. Claims 6-12 and 15 all claim a controller or a method of controlling, which finds a top dead center position of a piston stroke. The specification shows how to measure a time it takes a core to pass a particular point twice. But there is no discussion of how to use the time to estimate the top dead position. As discussed in the objection to the specification, the most likely way to use the time to calculate the top dead center is to integrate the speed of the piston over a first half of the time, but there is no way shown of estimating the speed during this part of the piston movement.

Claims 1, 3-6, 8 and 10 are rejected under 35 U.S.C. § 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

In claim 1 line 4 "first sensor coil and a second sensor coil connected in series" is wrong. Fig 5 clearly shows the first and second sensor coils (2a, 2b, respectively) connected in parallel, not in series.

Claims 3-6, 8 and 10 are indefinite, since they depend from claim 1.

Claim Rejections - 35 USC § 101

Claims 1, 3-6, 8 and 10 are rejected under 35 U.S.C. 101 because the claimed invention lacks patentable utility. The sole purpose of the core having two parts is to be able to calculate the top dead center. But, as discussed above, the specification does not show how to calculate the top dead center from just the measured time. Since the purpose of the core having two parts has not been met by the disclosure, it does not have utility.

Claim Rejections - 35 USC § 102

Claims 1 and 3 are rejected under 35 U.S.C. § 102(b) as being anticipated by Shimizu et al. Shimizu et al discloses a piston cylinder device comprising including first and second cores (21b) spaced from each other by a predetermined distance forming a core combined with the piston (21e); first and second sensor coils (A2, B2, C2, D2) detecting a position of the core, and wherein the first core is shorter than half the lengths of the first and second sensor coils combined. Shimizu et al states the "length of each coil is substantially equal to the length of each magnetic ring 21b" (column 6 line 10-11), which means that the coils can have exactly the same length, a slightly larger or a slightly smaller length as the magnetic ring. When the coils are slightly larger than the core, it meets this limitation. Note that the term "linear compressor" is considered intended use, and therefore given no patentable weight.

Conclusion

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Dan Lopez whose telephone number is (571)-272-4821. The examiner can normally be reached on Monday-Thursday from 6:00 AM -4:30 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Ed Look, can be reached on 571-272-4820. The fax number for this group is 571-273-8300. Any inquiry of a general nature should be directed to the Help Desk, whose telephone number is 1-800-PTO-9199.

/F. Daniel Lopez/

F. Daniel Lopez
Primary Examiner
Art Unit 3745
September 27, 2007